require other peripheral and common equipment to accommodate single line growth. HAI simply ignores the costs associated with this peripheral and common equipment.

The cost studies submitted by Hawaii, Kentucky, and Minnesota also fail to incorporate host/remote architecture as mandated in the *Public Notice*.[43] While HAI 5.0a is theoretically capable of modeling hosts and remotes, there are *two* practical problems with the Model's approach:

(1) HAI 5.0a designates this as a user-function which none of these state commissions have decided to use, thus rendering this option useless. Since the HAI Model was run in default mode to produce costs in Hawaii, Kentucky, and Minnesota – no remotes are placed, stand-alone switches are assumed, per-line prices are utilized for investment calculations, and fixed costs are ignored.

(2) The HAI proponents have criticized the embedded network configurations found in the Local Exchange Routing Guide ("LERG") as not being optimal, however, the Model does not provide the user with any information regarding how to create an optimal network using host and remote switches.

F. The HAI Default Plant Mix Assumptions Are Unreasonable.

This defect applies only to the cost studies submitted by the states of Hawaii and Kentucky. The Minnesota Commission rejected HAI's default inputs for plant mix, properly electing to use Minnesota-specific values in their study.

43/ *See Public Notice*, ¶ B.1(b).

With respect to the cost study submitted by the state of Hawaii, the plant mix assumptions are no longer supported by even the Model sponsors.[44] The local zoning ordinances require that new construction plant is to be buried, not placed aerially.[45] Accordingly, Hawaii's cost study fails to meet this requirement of Criterion One. Similarly, Kentucky failed to modify the default plant mix assumptions in order to take into account the existing mix of aerial, buried, and underground cable.

III. THE HAI MODEL VIOLATES CRITERION TWO.

Criterion Two states as follows:

> **Any network function or element, such as loop, switching, transport, signaling necessary to produce supported services must have an associated cost.**

The HAI Model does not include many of the costs necessary to provide supported services, as can be seen through the following examples.

44/ When presented with this local ordinance, AT&T's witness Terry Murray conceded "we have not undertaken an exhaustive review of Hawaii's zoning regulations . . . certainly if the record shows and this Commission's knowledge shows that the forward-looking situation in Hawaii is that there is a requirements for a greater percentage of buried plant, it would be my recommendation . . . that the appropriate forward-looking assumption should be used." In the Matter of Order No. 15418 filed April 2, 1997, instituting a proceeding on communications, including an investigation of the communications infrastructure of the State of Hawaii, Tr. 1558 (October 15, 1997).

45/ Revised Ordinances of Honolulu, 1990, Chapter 22; Docket No. 7702, Exhibit HTC-H-28.

A. The HAI Model Does Not Properly Account for Digital Loop Carrier Costs.

The Model does not include many of the costs associated with DLC equipment. Specifically, capital costs for rights-of-way have not been included beyond the $3,000 allocated for site preparation and power. Site costs actually range from $40,000 to $60,000 in suburban areas. In urban areas, underground sites can cost up to $150,000.[46] The HAI Model also fails to account for the costs of precast concrete huts and controlled environment vaults that are commonly used to house DLC remote terminals.

B. Drop Lengths and Investment Are Understated.

The HAI Model provides for fixed drop lines by density zone that are not long enough to reach the houses of many customers. The HAI engineering team received five estimates concerning drop length in response to their industry survey. For rural areas, the lengths ranged from 94 to 375 feet, while for suburban areas, lengths ranged from 75 to 100 feet. Although the shortest drop distance estimated in the industry survey was 75 feet, Hatfield assumes a drop distance of 50 feet in high-density zones. These drop lengths are simply not long enough to connect the customer to the network. This fact becomes even more apparent when an analysis of the HAI clustering process is applied to drop length. There is no possible way that lots with 500 feet of

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46/ *See* Rebuttal testimony of C.R. Curbelo before the New York Public Utility Commission, Docket No. 95-C-0657, 94-C-0095, 91-C-1174, Oct. 14, 1996.

road frontage could be served via 150 foot drop wires that originate at the lot corner, as assumed in HAI. Hawaii, Kentucky, and Minnesota have 242, 1,099 and 923 such lots respectively.

The Hatfield Inputs Portfolio indicates that these assumptions are based upon the most recent nationwide study of actual loop lengths, the average drop length is 73 feet. However, when HM 5.0 is run for the companies included in the survey, it calculates an average drop length of 64 feet, understating the nationwide BOC drop wire investment by over $750 million. Similarly, the average drop length in the 1993 New Hampshire Incremental Cost Study, which the Hatfield modelers heavily rely upon for switch maintenance assumptions, was 125 feet. When run for the State of New Hampshire, the Hatfield Model produces an average drop length of only 83 feet, understating the New Hampshire drop investment by nearly $16 million.

C. The HAI Model Does Not Properly Account for All Operations Support Systems Costs.

An important aspect of providing telecommunications services is the ability to build, test, and maintain all types of network elements. Presently, the two most common vehicles for performing these functions are the Switched Access Remote Test System ("SARTS") and the Mechanized Line Test ("MLT") system. AT&T agrees that "testing is a network operations function that all loops must, or at least should undergo,

whether provisioned for the LEC's own use or for competitive local exchange carriers."[47] AT&T also acknowledges that technicians are equipped to get remote access to test systems such as SARTS and MLT in order to complete their work in a mechanized fashion from the field.[48] The HAI Model, however, ignores testing investment and reduces testing expense by 50 percent through its "network operations factor." The HAI Model does not include the costs associated with Special Service Centers ("SSCs") and the SARTS vehicle used by the employees in the SSCs claiming that "both are embedded methodologies that may reflect incumbent LEC inefficiencies and thus would not represent forward looking technology."[49] Yet, HAI does not model any replacement testing technology.

D. The HAI Model Ignores All Emergency 911 Costs.

In its *Universal Service Order*, the Commission included "access to emergency services, including in some instances, access to 911 and enhanced 911 ('E911') services" in its definition of Universal Service.[50] The HAI Model does not include any investment or costs for emergency services. There are no provisions for either the

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47/ *See* AT&T's Response No. 115 to GTE's Data Request in the Washington Generic Cost Proceeding, Docket Nos. UT-960369, -70, -71.

48/ *See* Testimony of Bonnie R. Petti on Behalf of AT&T Communications, Washington Generic Cost Proceeding, Docket Nos. UT-960369, -70, -71, Apr. 25, 1997, at 25.

49/ *See* AT&T's Response No. 115 to GTE's Fifth Set of Data Requests to AT&T in the Washington Generic cost Proceeding, Docket Nos. UT-960369, -70-71.

50/ *Universal Service Order,* at ¶ 56.

trunks or the tandem switches necessary to offer emergency services.[51] The failure of HAI to include this critical (and FCC mandated) component of the forward-looking network is another of the Model's serious shortcomings that prevents the modeled network from being fully operational.

IV. THE HAI MODEL FAILS TO COMPLY WITH CRITERION THREE.

Criterion Three directs that:

> **Only long-run forward-looking economic cost may be included. The period used must be a period long enough that all costs may be treated as variable and avoidable. The costs must not be the embedded cost of the facilities, functions, or elements. The study or model, however, must be based upon an examination of the current cost of purchasing facilities and equipment, such as switches and digital loop carriers (rather than list prices).**

Criterion Three prescribes the methodology by which the cost model inputs must be developed. GTE discussed at length the deficiencies of the HAI Model default inputs in its June 12, 1998, Comments. GTE, hereby incorporates these Comments by reference.

On two separate occasions the Commission has clarified its original directive as to the correct meaning of "forward-looking economic cost." First, in its *Universal Service Order*, the Commission stated, "we mean the cost of producing services using

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51/ Supplemental Testimony of Robert A. Mercer on Behalf of AT&T Communications of the Southwest, Inc. and MCI Telecommunications Corporation, Before the Public Utility Commission of Texas, Docket No. 18515, June 5, 1998, at 29.

the least-cost, most-efficient, and reasonable technology *currently available for purchase with all inputs valued at current prices.*"[52] Second, in its February 28, 1998, *Public Notice*, the Commission stated that compliance with Criterion Three requires state commissions to "describe and verify how the costs of facilities and equipment used in the study reflect *the current costs of purchasing those facilities and equipment.*"[53]

The Kentucky, Hawaii, and Minnesota commissions relied upon, to varying degrees, the HAI default inputs. In the instances where these commissions adopted the HAI default values, the requirements of Criterion Three are not met. HAI Model's default inputs are not verifiable because they are based almost solely on the biased opinions of the Model's developers, and they do not reflect current costs.

The HAI Model sponsors did not use consistent, reliable, or trustworthy methods to determine their input values. In fact, AT&T and MCI boast that "the HAI Model default values were not based on *any* price quotes; they were based on the judgment of a panel of outside plant experts with almost two hundred years of collective experience."[54]

52/ *Universal Service Order*, ¶ 224 (emphasis added).

53/ *Public Notice*, ¶ B(3).

54/ Reply Comments of AT&T Corp. and MCI Telecommunications Corporation on Designated Input and Revenue Bench Mark Issues filed June 18, 1998.

The Model developers have continuously changed the inputs from model version to version, revising their "expert opinion" time and again without any explanation. Moreover, the data that the developers collected *after* determining input values was not gathered in a methodologically honest way, and impeaches many of their opinion-based assumptions. Two state commissions have found this validation survey to be useless; rejecting it entirely.[55]

Even where there is no publicly-available documentation, and no indication that an ILEC's current costs are unreasonable, the HAI Model developers have refused to use ILEC current costs.[56] They have not even considered the very data collected by AT&T employees tasked with determining the cost of entering the local market through facilities based competition. [57] James Wells, an HAI sponsor, could not identify any documents that any of the HAI Model consultants used to form their opinions. Instead, the sponsors rely on faded memories which conveniently result in costs that are approximately half those that GTE currently experiences.

55/ New Mexico State Commission, Findings of Fact, Conclusions of Law and Order, Docket No. 97-35 TC, ¶ 47 (Sept. 19, 1997); Order of the Washington Utilities and Transportation Commission, Docket Nos. UT-960369, 960370, 960371, ¶¶ 93-94 (May 11, 1998).

56/ In the proceeding before the Kentucky Commission, AT&T witness James Wells conceded he had not reviewed any documents used to form his opinions, and therefore based his opinions on his pricing knowledge from his work at AT&T in the early 1990's. Tr. 8-9, 10-13.

57/ All this costing data was destroyed, according to an affidavit filed with the Alabama Public Service Commission by Kenneth L. Gazaway.

V. THE HAWAII COST STUDY DOES NOT SATISFY CRITERION FIVE.

The Hawaii cost study should be rejected because it clearly has not recommended forward-looking economic lives. GTE, in its support of Ameritech's waiver of Criterion Five, requests that lives be established that are forward-looking financial reporting lives which are shorter than the FCC ranges, whereas the state of Hawaii has recommended lives that are longer than the FCC ranges for some accounts and salvages that are higher than the FCC ranges for several accounts.

In its cost study, the state of Hawaii adopted the depreciation lives and future net salvage percentages approved for GTE in an earlier docket and established in 1992. . Specifically, the lives for Operator Systems, Aerial Metallic Cable, and Buried Metallic Cable all exceed the FCC ranges. Similarly, the salvage values for Motor Vehicles, Operator Systems, Aerial Non-metallic Cable, Underground Non-metallic Cable, and Conduit Systems fall outside the authorized ranges. Accordingly, the cost study submitted by the state of Hawaii should be rejected.[58]

VI. THE HAI MODEL FAILS TO COMPLY WITH CRITERION SIX.

Criterion Six directs as follows:

> **The cost study or model must estimate the cost of providing service for all businesses and households within a geographic region. This includes the provision of multi-line business services, special access, private lines, and multiple residential lines. The inclusion of**

58/ *Hawaii Cost Study Submission* at 23-24.

multi-line business services and multiple residential lines will permit the cost study or model to reflect the economies of scale associated with the provision of these services.

The key to meeting this criteria is understanding that although at any given time not all housing units require service, any existing unit can require service at any time. Customers expect service within a timely period, and consider it inefficient if the carrier cannot provide service in a reasonably short period of time. Most state commissions regulate installation periods.[59] Thus, carriers must install and maintain network facilities for all housing units in their area, regardless of whether they are occupied.

The HAI Model builds a network only to households with telephones and, therefore, cannot provide service to all potential customers within a geographic area. Accounting only for households that currently have telephones undermines the whole purpose of universal service - achieving 100 percent penetration so that all Americans have access to basic services and the opportunity to receive advanced services. Assuming that households without telephones reflect a market that is not attainable is a premise that a firm operating in a competitive market cannot afford to make voluntary.

The HAI Model sponsors claim that many vacant housing units in rural areas are vacation homes that should not be included in universal service support decisions. This

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59/ For instance, the State of Hawaii requires completing installation of service within three days of receipt in 90 percent of requests for basic service. Kentucky requires 90 percent of applications for regular service to be completed in five working days. Similarly, the state of Minnesota requires 90 percent of the utility's commitment to customers as to the date of installation shall be met.

assertion is belied by Census Bureau statistics. These statistics show that 13.7 million households are vacant (11.7 percent of all households). Of these, 10.4 million, or 76 percent, were classified as year-round use.[60] A significant portion of these units are vacant pending rental turnover or real estate transfers. These tenants or buyers will expect to have telephone service in their new location as soon as these rental or real estate transactions are completed. Further, GTE provides express dial tone in numerous central offices which provides access to 911 and business offices even in uninhabited residences.[61] Accordingly, all households should be modeled in the cost study regardless of occupancy or if there is a working phone.

VII. THE COST STUDY SUBMITTED BY THE STATE OF KENTUCKY FAILS TO SATISFY CRITERION SEVEN.

Criterion Seven requires that:

> **A reasonable allocation of joint and common costs should be assigned to supported services.**

The Kentucky Commission accepted at face value the HAI Model sponsors assertion that a reasonable allocation of joint and common costs are assigned to supported services. The HAI Model treats common costs by simply increasing all of its cost estimates by 10.4 percent, based on AT&T's corporate overhead rates in 1994. There are three problems with this figure:

60/ United States Department of Commerce News, CB98-58 (Apr. 21, 1998).

61/ Express dial tone is available in California, Florida, Hawaii, Idaho, Kentucky, Oregon, and Washington.

- This figure is chosen from a single company that has not been shown to be representative of the local exchange industry. Further, it is not the competitiveness of an industry that dictates how much of its total costs are common. Rather, it is the structure of its technology.

- The 10.4 percent figure is based upon a "one-year snapshot" from one firm reflecting data four years old.

- AT&T's own CEO claims that AT&T's overhead as a percentage of revenue is 29 percent.[62] This directly contradicts the 10.4 percent figure proposed by HAI. The HAI figure represents the percentage of **overhead to revenue *less overhead***, whereas the AT&T figure represents a simple ratio of **overhead to revenue**. AT&T's own overhead figures translate to a HAI overhead factor of 40.8 percent.

This treatment of common costs as an across-the-board increase in attributable cost is both arbitrary and incorrect. It neither appropriately attributes cost to the correct source (by definition common costs cannot be meaningfully attributed) nor does it serve as a method for measuring common costs. Accordingly, the cost study submitted by the state of Kentucky fails to satisfy Criterion Seven.

VIII. THE HAI MODEL FAILS TO SATISFY CRITERION EIGHT.

Criterion Eight mandates that:

> **The cost study or model and all underlying data, formulae, computer software associated with the model should be available to all interested parties for review and comment. All underlying data should be verifiable,**

62/ Peter Elstrom and Kathleen Kerwin, "New Boss, New Plan," *Business Week*, (February 2, 1998), pp. 122-132.

engineering assumptions reasonable, and outputs plausible.

The HAI Model fails to comply with all three of the Commission's directives in Criterion Eight. The HAI Model is not open or verifiable, its engineering assumptions are not reasonable, and its outputs are absolutely implausible.

A. The HAI Model Is Neither Open Nor Verifiable.

The HAI Model developers claim that one of the major changes between HAI and its predecessors is a fundamental revision of the customer location methodology. However, this revision of the customer location methodology cannot be fully evaluated due to the limited review that has been provided to GTE. First, none of the approximately 12 databases and 5 models that were used in determining the Model's customer location layout were made available for review in the Hawaii, Kentucky, or Minnesota proceedings.[63] Nevada was the first state commission to allow GTE and other ILECs discovery of the PNR clusters. Consequently, the decisions of the Hawaii, Kentucky, and Minnesota Commissions were made on a record devoid of any information concerning the flaws in the Model's design of distribution plant.

B. The HAI Model Ignores Reasonable Engineering Standards.

In designing outside plant, network engineers are expected to recognize accepted industry guidelines and practices, many of which are documented in

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63/ Subsequently, the Minnesota Commission has allowed such discovery in a pending UNE docket.

publications such as AT&T's *Outside Plant Engineering Handbook* ("AT&T Handbook"), and the *Bellcore Notes on the Networks*. In the telecommunications industry, other guidelines are set forth in the specifications issued by the equipment manufacturers. Nevertheless, the HAI proponents reject these authoritative sources in favor of the "expert opinion" of their consultants.

- **The AT&T Handbook recommends *buried plant* as the first "choice" of providing outside plant facilities beyond the underground network (AT&T Handbook, Section 9-1).**[64]

  The HAI Model assumes the opposite, placing 60 percent and 85 percent aerial distribution cable in the two highest density zones, respectively.

- **Copper feeder cable is normally sized to satisfy the growth requirements on a primary route for a period of five to seven years, while buried distribution cables should be sized for the ultimate requirements in that area (AT&T Handbook, Section 3-7, Section 9-3).**

  The HAI Model does not account for any growth. As James Wells, a member of the HAI engineering team, testified in North Carolina:

  > [T]hese models should not reflect what current ratepayers or CLECs that want to lease the network should be paying for future capacity. The model should just serve the demand that's out there. And so to answer your question it does not -- the HAI Model does not allow for

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64/ Express dial tone is available in many states including California, Florida, Hawaii, Idaho, Kentucky, Oregon, and Washington.

growth and I would suggest that these models should not allow for growth.[65]

- **Distribution cables should be sized for the "ultimate" pair requirements. Specifically, the AT&T Handbook recommends two pair per residential living unit as the optimum choice and 5 pair per business unit (AT&T Handbook, Section 3-11).**

  The HAI Model determines its distribution cable pair requirements based on allocation of current ARMIS line counts and the application of distribution cable fill factors designed to satisfy "current demand plus some amount of growth." This methodology is inconsistent with industry Long-Range Outside Plant Planning Process described in the AT&T Handbook.

- **Joint trenching with power facilities should be employed only for distribution cables and service wires, not for feeder or trunk cables (AT&T Handbook, Section 9-6).**

  The HAI Model assumes feeder cable will always be jointly trenched, allocating only 40 percent of the joint trenching costs to the ILEC.

- **The AT&T Handbook recommends placing fiber optic cable at a depth of between 36-48 inches (AT&T Handbook, Section 9-12).**

  The HAI Model assumes the maximum depth for placement of cable is 36 inches -- even when burying fiber cable.

65/ Testimony of James W. Wells on behalf of AT&T, North Carolina Utilities Commission, Dkt. P-100, Sub. 1336 (Feb. 4, 1998) at 136-137; *see also* Testimony of John Donovan before the Alabama Public Service Commission, *In the Matter of Implementation of the Universal Service Requirements of Section 254 of the Telecommunications Act of 1996*, Docket No. 25980 (February 25, 1998) at 1785.

- **The line loss limit for good quality telephone service should not exceed 8.0 decibels (dB) of loss for the entire line (Technical Information Document, No. 98-006 at 8).**

  The HAI proponents engineer loops that will lose approximately 12.2 decibels for 26-gauge cable, and 10.5 decibels for 24-gauge cable. This means customers will have to shout into the phone to be heard and modems will not work at their designed speeds.

- **The goal is to have the entire local loop network ultimately capable of supporting a transmission rate of 64 kb/sec. non-loading 26-gauge cable is capable of providing this bit rate within 12,000 feet (3657.6 m) of the serving central office. Digital subscriber carrier (pair gain) is necessary to meet that bit rate beyond 12, 000 feet (3657.6 m). (AT&T Handbook, Section 13-1).**

  The December 1997 *Bellcore Notes on the Networks*[66] specifies 12,000 feet as the current CSA standard to ensure quality 2-wire voice transmission and the capability to support advanced digital services, including repeaterless digital data service (DDS), and ISDN basic rate transmission (2B+D)

  For the Litespan 2000 the digital loop carrier modeled by HAI 5.0a, the vendor documentation "strongly recommends" that extended range cards be used in loops beyond 12,000 feet.

  The Model violates these guidelines by extending the distance that 26-gauge copper cable is used to 18,000 feet without modeling extended range line cards, thereby impeding the provision of advanced services.

66/ *Bellcore Notes on the Networks*, Special Report SR-2275, Issue 3, December 1997, at 12-5.

This practice of rejecting established guidelines is significant in two respects: (i) it demonstrates the HAI Model developers' tendency to reject empirical data in favor of unverifiable expert opinion, and (ii) it demonstrates that the cost estimates produced by the HAI Model are not achievable unless accepted engineering standards -- imposed for aesthetic, quality, and safety reasons -- are ignored.

C. The HAI Outputs Are Not Plausible.

The outputs of the HAI Model are not plausible, and clearly jeopardize universal service objectives in a forward-looking environment. This deficiency is exposed through two simple exercises: (1) a comparison of HAI's model results to GTE's current levels of universal service support and (2) an analysis of the evolution of the HAI Model.

GTE has quantified the current level of implicit subsidies in its rate structure. Essentially, GTE compared each Commission's interim rates for UNEs[67] to the company's annual revenues to determine the support flow.[68] GTE calculated implicit support at $32 million, and $90 million, for the states of Hawaii and Kentucky respectively.[69] The HAI Model produced a fund of $9.2 million for Hawaii and $36

67/ To determine the economic cost of service in Kentucky, the component UNEs were summoned and marked up by the ordered avoided cost discount. Hawaii's implicit support was estimated by comparing the cost per wire center and proposed R1 rate for that wire center

68/ Underlying this calculation is the fact that GTE's current regulated revenues reflect its actual costs plus a reasonable profit.

69/ These figures represent the intrastate portion of GTE's implicit subsidies.

million for Kentucky.[70] These results demonstrate the HAI Model's results are not plausible.

If the HAI Model results were plausible, the fund size should have approximated the calculated implicit subsidies in both states because the implicit subsidies represent the universal service support implicit in the existing rates where the price exceeds the cost. These same services, i.e., access, toll and vertical, are the services that will be reduced when a universal service fund is established. If the fund size is insufficient to eliminate all implicit subsidies, not only will the amount of universal service support be insufficient to the incumbent local exchange company but price distortion will continue. Since universal service is portable, the ultimate provider of service will not receive the appropriate amount of support.

Secondly, the evolution of the HAI Model vividly illustrates that its output reflects implausible costs. In the past eighteen months, the HAI Model has progressed from Release 2.2.1, to 2.2.2, to 3.0, to 3.1, to 3.1 "update," to 4.0, to 5.0, and now to 5.0a. Despite these successive revisions, the HAI Model bottom line remains nearly the same. Loop and total costs remain virtually unchanged. The reason is telling, and calls into question the underlying integrity and plausibility of the Model.

The following table, which is based on Hatfield Model estimates for GTE California, illustrates this point:

70/ These figures represent only the intrastate portion of the fund.

TABLE 4

The Evolution of Hatfield

Version	2.2.2	3.0	3.1	3.1 Update	4.0 Preliminary	4.0	5.0
Release Date	9/4/96	2/7/97	2/28/97	4/12/97	7/1/97	8/1/97	12/11/97
Total Loop	$11.12	$12.64	$12.08	$11.24	$9.46	$9.50	$8.43
Cost of Switched Network Element	$15.93	$16.59	$17.40	$16.59	$14.12	$14.16	$12.99
Sheath Miles	17,492	46,821	50,792	37,485	27,407	27,371	24,412

As a general matter, Hatfield revisions that lead to *increased* costs are made only when its critics are able to demonstrate clear-cut flaws in the earlier versions. The revisions typically address: (1) documented understatements of loop length and line counts; (2) acknowledged algorithmic errors that had a downward effect upon costs; and (3) admitted omissions of necessary technology.

For example, Version 2.2.2 was widely criticized in the arbitration proceedings as understating the amount of feeder and distribution structure associated with most wire centers, particularly in rural areas. In those arbitrations, the ILECs were able to compare the actual line counts and loop lengths with those assumed by the Hatfield Model. Version 3.0, released in February, 1997, was intended to correct these. Although the changes in Version 3.0 caused sheath miles of cable to increase considerably (17,492 to 46,821 sheath miles) and should have resulted in more than a $250 million increase in structure costs, the resultant Hatfield Model loop cost only increased slightly from Version 2.2.2 to Version 3.1. (from $11.12 in Version 2.2.2 to $12.08 in Version 3.1) Similarly, the errors identified in the original release of Version

3.1 (algorithmic mistakes and misassigned household counts), resulted in an understatement in total switched network element costs. When these errors were allegedly addressed in Version 3.1 (Updated), loop costs for GTE's serving area in California decreased from $12.08 to $11.24. This reduction came on the heels of a previous reduction of $.56 in total loop costs from Version 3.0 to 3.1. Not even dramatic changes to the HAI Model's outside plant assumptions resulted in any significant change in the Hatfield outputs.

The reason for this apparent anomaly (*i.e.*, more plant/same result) is because each new release has been invariably accompanied by cost decreases that more than offset the cost increases. Typically, the revised cost decreases have come in the form of undocumented and unverifiable assumptions regarding future efficiency gains. Because these efficiency gains are, by definition, theoretical, they are difficult to document -- or to contradict. For example, significant cost savings are made possible by the HAI Model's structure sharing assumption, savings that might arise from improved cooperation with other utilities. The initial structure sharing percentages in Version 2.2.2 assumed that the ILEC was accountable for 33 percent of the aerial placement cost. In Version 3.0 and 3.1, the aerial sharing fraction declined to 25 percent in most density zones. Also, the "network operations factor," based solely on speculative efficiency gains, dropped from 70 percent in Version 2.2.2 to 50 percent in Version 3.0 -- again without any documentation or supporting empirical data.

The pattern is clear: whenever a version of the HAI Model has been impeached with hard evidence of inadequate plant or insufficient costs, the developers have responded by implementing downward adjustments in their theoretical and speculative assumptions -- opinions that are less subject to empirical contradiction. The low loop costs exhibited in Table 4 are less the product of an accurate, unbiased methodology -- and more the result of an AT&T/MCI consensus regarding the amount they are willing to pay to enter the market.

Reply Comments filed by BellSouth, in CC 96-45, DA 98-848 on July 12, 1998, support GTE's contentions. BellSouth's compelling analysis demonstrated that if the user-adjustable inputs that are common between Version 2.2.2. and 5.0a of the Model are held constant, the Universal Service Support level produced by the Model rises significantly (from $63.7 Million to $93.6 Million).[71] This analysis clearly illustrates the tendency on the part of Hatfield Model developers to modify user adjustable inputs in conjunction with modifications to the Model platform in order to produce the lowest possible cost results.

IX. THE HAI MODEL VIOLATES CRITERION NINE.

Criterion Nine states as follows:

> **The cost study or model should include the capability to examine and modify the critical assumptions and engineering principles. These assumptions and**

71/ *Id.*at 16.

principles include, but are not limited to, the cost of capital, depreciation rate fill factors, input costs, overhead adjustments, retail costs, structure sharing percentages, fiber-copper cross-over points, and terrain factors.

HAI Model users can not examine **or modify** the engineering parameters that define the serving areas or "clusters" as they are called in the HAI documentation.[72] As discussed above, GTE has had very limited access, only where commissions have ordered such discovery. Further, the engineering parameters are hard-coded in the PNR Clustering software that is part of the proprietary preprocessing stage used to develop input data for the HAI Model. As such, they are not available to the user to examine or modify. While the user adjustable input for the "maximum analog copper total distance" can be changed within the HAI Model itself, the results produced are suspect, since the serving area size remains optimized for maximum copper loop lengths of 18,000 feet no matter what input value is chosen by the user.[73]

72/ "No point in a cluster may be more than 18,000 feet distant (based on right angle routing) from the cluster's centroid. No cluster of nondegenerate area may exceed 1800 lines in size. No point in a cluster may be farther than two miles from its nearest neighbor in the cluster." HAI Model 5.0a, Model Description, February 2, 1998, § 5.5.1.

73/ This is precisely the method of modification adopted by the Kentucky Commission.

X. COMPLIANCE WITH CRITERION FIVE AND FOUR SHOULD BE WAIVED BY THE COMMISSION.

A. Ameritech's Request for Waiver of the Requirements of Criterion Five Should Be Granted.

Criterion Five states as follows:

> **Economic lives and future net salvage percentages used in calculating depreciation expense should be within the FCC-authorized range and use currently authorized depreciation lives.**

On May 26, 1998, Ameritech Michigan requested a waiver with respect to Criterion Five for the cost study submitted by the state of Michigan.[74] GTE concurs with Ameritech Michigan's request, although GTE urges this waiver apply to all cost studies.

Although the states of Kentucky and Minnesota filed depreciation lives that comply within the FCC's authorized ranges, GTE contends that the Commission's current depreciation ranges are not reflective of the economic lives or salvage values used by ILECs or other telecommunications carriers. In fact, many state commissions noted the fact that they were constrained in their decision by this directive, and selected lower economic lives in unbundled network proceedings.[75] In adopting lives within the FCC ranges, the Minnesota Commission expressly noted its lack of discretion stating,

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74/ *Request for Waiver*, CC Docket No. 96-45 (May 26, 1998).

75/ California Public Utilities Commission Decision, No. D.96-08-021, Adopted August 2, 1996, in Rule Making R.93-04-003, I.93-04-002.; Case No. TO-97-63, Missouri Public Service Commission Final Arbitration Order, issued July 31, 1997; Michigan Docket No. U-11281, February 25, 1998 Order.

"Universal Service Order ¶ 250(5) states: 'Economic Lives and future net salvage percentages used in calculating depreciation expense must be within the FCC-authorized range . . . . Again compliance with ¶ 250 is required.'"[76] The Commission should allow ILECs to use economic lives and salvage values to compute depreciation so that they are not at a competitive disadvantage as competition continues to increase in the local exchange market.

The depreciation lives and salvage values currently included in the Commission's ranges should not be used as cost model inputs because they were designed to keep depreciation expense, and thus rates, as low as possible rather than to mirror economic reality. These artificially low rates have resulted in ILECs incurring considerable reserve deficits. Therefore, as explained in detail in prior comments,[77] GTE urges the Commission to allow ILECs to use the same depreciation rates and salvage values as used for financial reporting or, in the alternative, to establish a range based on the depreciation rates and salvage values used by IXCs and CLECs for their financial reporting.[78]

76/ Docket No. P-99/M-97-909 at ¶ ¶ 147-150 (April 2, 1998).

77/ GTE Comments, and GTE Reply Comments, CC 96-45 DA 98-848, filed June 1, 1998 and June 12, 1998, respectively.

78/ IXCs and CLECs use the same types of equipment as ILECs so the rates that these entities use for their own financial reporting is persuasive evidence of the economic lives of these assets.

B. Criterion Four Should Allow States to Utilize a Forward-Looking Cost of Capital.

Currently, Criterion Four provides:

> **The rate of return should be either the authorized federal rate of interstate services, currently 11.25 percent, or the state's prescribed rate of return for intrastate services.**

Although the Hawaii, Kentucky, and Minnesota have filed cost studies adopting rates of return that comply with the guidelines set forth in Criterion Four, GTE contends that a forward-looking rate of return is more likely to estimate the returns commensurate with the competitive environment of the future. This forward-looking rate of return is largely determined by the risk associated with investing in a local telecommunications carrier. The primary risk factor is the prospect of increased competition and the attendant loss of market share. Therefore, the forward-looking cost of capital is the appropriate cost to be used.

XI. CONCLUSION

Based upon the foregoing, the Commission should reject the HAI Model cost studies submitted by the states of Hawaii, Kentucky, and Minnesota in their entirety. In addition, the requirements of Criterion Four and Five should be waived to allow more forward-looking cost of capital and depreciation expense to be incorporated into the cost studies.